

**ABSTRACT**

This invention discloses methods to attach and grow a monolayer of cultured human corneal endothelial cells onto the endothelial side of the stroma synthesized from biopolymer to generate a more bio-equivalent artificial cornea. The approaches will include the use of attachment and growthpromoting agents such as fibronectin, laminin, RGDS, collagen type IV, bFGF conjugated with polycarbophil, and EGF conjugated with polycarbophil. The patent also describes a method to create a self-sustaining polymer containing adhesive molecules and growth factors to support the attachment and proliferation of cultured human corneal endothelial cells for corneal transplantation either as a half -thickness device or full-thickness button replacement. An approach for the implantation of cultured retinal pigment epithelial (RPE) cells into the sub-retinal space for treatment of age-related macular degeneration (ARMD) is disclosed in this invention. This method will enable the delivery of the transplanted RPE in a sheet of monolayer cells and will be better suited to perform their physiological function.